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REPORT ON A COLLECTION OF JAPANESE CRANE-FLIES (TIPULIDÆ), WITH A KEY TO THE SPECIES OF PTYCHOPTERA.

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(Continued from page 295).

Tribe *Limnophilini*.

Genus *Limnophila* Macquart.

KEY TO THE JAPANESE LIMNOPHILÆ.

1. Wings unspotted (subgen. *Limnophila*) *inconcussa*, sp. n.
Wings marked with brown (subgen. *Pæcilostola*) 2.
2. Large species (male, length 22-25 mm.; wing over 15 mm.);
wings with a few large seams or blotches *satsuma* Westw.
Small species (male, length 10-13 mm.; wing under 12 mm.)
wings with abundant dots in the cells 3.
3. Legs and abdomen yellow throughout; petiole of cell M₁ as
long as cell 1st M₂ *varicornis* Coq.
Legs with segments tipped with brown; abdomen yellow and
brown; petiole of cell M₁ longer than cell
1st M₂ *japonica*, sp. n.

Limnophila inconcussa, sp. n.

Wings unspotted; cross-vein r far from tip of R₁.

Rostrum brownish yellow beneath, brown above, palpi brown; antennæ dark brown, the third segment more yellowish at its base; antennæ short, reaching about to the wing basis; front, vertex and occiput dark brown, dusted with grey.

Mesonotum greyish with a median brown stripe; pseudo-sutural fovea and tuberculate pits very distinct, black; scutum, scutellum and postnotum brown, pleuræ dark brown (probable that the body, in dried specimens, is grey). Halteres pale. Legs: coxæ and trochanters dull yellow; femora yellow, a little darkened

*Contribution from the Entomological Laboratory of Cornell University.

before the tip; tibiæ yellow, brown at tip; first tarsal segment yellow, brown at tip, remainder of tarsi brown. Wings with a brownish yellow tinge; stigma indistinct, brown; veins Sc and R yellow, remainder brown. Venation (see fig. 2, pl. II): R_{2+3} arcuated, long, cross-vein r almost at its fork; Rs long; cross-vein r-m more distad than fork of cell; basal deflection of Cu₁ at or slightly beyond the fork of M.

Abdomen: tergites light brown; sternites much paler, yellowish. Hypopygium (see fig. 12, pl. X): pleurites elongate, slender, cylindrical, clothed with long hairs; two apical appendages, elongated, the outermost longest, more slender, chitinized, directed cephalad, its tip produced into a slender spine and its inner or cephalic edge near the tip armed with blunt denticulæ; inner appendage shorter, a little stouter and more fleshy, clothed with long hairs, especially on the inner face; the anal tube prominent, oval.

Vial No. 2.—Tokyo, Japan; 1 ♂, 1 ♀.

Vial No. 9.—Tokyo, Japan; April 25, 1912; 2 ♂, 2 ♀.

Vial No. 17.—Tokyo, Japan; April 25, 1912; 3 ♂, 7 ♀.

Vial No. 27.—Tokyo, Japan; April 25, 1912; 4 ♀.

Holotype.—♂, Vial 2.

Allotype.—♀, Vial 2.

Paratypes.—5 ♂, 13 ♀, in Vials 9, 17 and 27.

Types in author's collection; paratypes in U. S. National Museum and Cornell University collections.

Of the American species, *inconcussa* is most like *toxoneura* O. S. (East. U. S.), but the cross-vein r is removed from the tip of R_1 , fusion of R_{2+3} is longer, etc.; the coloration of the two species is quite different. In Verrall's key to the British species (Ent. Mo. Mag., April, 1887, p. 264, 265), it runs down to *lucorum* Meig., which has a dark brown abdomen, brown legs, etc.

Limnophila (Pæcilostola) satsuma Westwood.

1876.—*Limnobia satsuma* Westwood, Trans. Ent. Soc. Lond., p. 504, pl. 3, fig. 5a, 5b.

1881—*Limnobia satsuma* Westwood, Ent. Soc. Lond., p. 383.

1888.—? *Epiphragma satsuma* Bergroth, Ent. Tidskrift, p. 138.

1902.— *Limnobia satsuma* Kertész, Cat. Dipt., Vol. 2, p. 177.

Male—Length 22.6 mm.; wing 16.8 mm.; hind leg, femur 14.1 mm.; tibia 12.2 mm.

Male—Rostrum and palpi brown, the apical segment of the latter darker; antennæ, segments one and two dark brown, flagellum yellow except the two last segments which are brown; front dark brown, vertex and occiput reddish brown, a narrow median streak continued back from the front.

Pronotum with the scutum dark brown, scutellum yellowish. Mesonotal præscutum rich reddish brown, the lateral margins of the sclerite more greyish, a darker brown median triangle, broadest in front, narrowed to a point at the suture, lateral stripes similar in colour to the median stripe; scutum, lobes dark brown, median line yellowish, dark brown on caudal portion; scutellum and postnotum dark brown. Pleuræ light brownish yellow; propleuræ and dorsal portions of the mesopleuræ up to the wing; root dark brown; mesostigma very large, conspicuous, situated just behind and under the pronotal scutellum. Halteres short, stem yellow, knob brown. Legs: coxæ light yellow; trochanters reddish yellow; femora yellow, tip brown, with a still darker subapical ring; tibiæ slightly darkened at the extreme base, a whitish sub-basal annulus, tip narrowly dark brown: tarsi brownish yellow, tips of the segments darker; legs conspicuously hairy. Wings (see fig. 4, pl. III.): cephalic third deep yellow, caudal portions yellowish grey; surface with conspicuous brown marks: a large blotch at base of M; at origin of Rs; at the cord; a narrow seam to cross-vein r; paler crown margins to Cu and the veins in the vicinity of cell 1st M₂ (discal). Venation (See fig. 4).

Abdomen: tergites rich yellow, extreme apical margin of the sclerites darker; a brown lateral line; sternites lighter yellow, apices, especially of the terminal segments, darker. Hypopygium (See fig. 11, plate X.): viewed from beneath, 9th sternite with caudal margin straight, the sides oblique; pleuræ very short, stout; dorsal apical appendage directed inward, cylindrical, chitinized, its tip with a sharp recurved hook; ventral apical appendages, two, the outermost chitinized, broad at base, rapidly tapering to a sharp point, directed inward, the lower appendage

is fleshy at the base, more chitinized at the tip, its caudal or outer margin grooved to receive the outer appendage. Viewed from above, 9th tergite concave, with a projecting median lobe; anal tube conspicuous, more pointed at upper end than in *japonica*

One male (Vial No. C; Tokyo, Japan; August, 1912); I give the above description to supplement Westwood's brief characterization. The species agree with *barbipes* Meigen (Europe) in its conspicuously hairy legs.

Limnophila (Pæcilostola) japonica, sp. n.

Wings spotted; tibiæ and femora tipped with brown.

Male.—Length 10-13 mm.; wing 9.8 mm. Female, length 15 mm.; wing, 11-12.3 mm.

Male.—Rostrum and palpi dark brown; antennæ dark brownish black, except segment three, which is pale yellow basally, the tip brown; antennæ short, if extended backward it would barely reach the wing basis; segment one elongate, as long as the succeeding three combined; segments 2-5 broad, oval-pyriform, gradually becoming more cylindrical; segments 6-16 cylindrical more elongate toward the end; front, vertex and occiput dark brown.

Pronotum and mesonotum dark brown. Pleuræ dark brown. Halteres long, stem yellow, knob brown. Legs: coxæ and trochanters dull brownish yellow; femora light yellowish brown, the tip broadly brownish black; tibiæ with base narrowly dark brown, remainder yellow, except the broad dark brown tip; tarsi dark brownish black. Wings tinged with brownish, cells C and Sc rather brighter; veins yellowish brown; wing spotted with brown, varying greatly in the size of the markings; in one (♀, Vial A), there are large brown spots at origin of Rs, tip of Sc and fork of R₂₊₃, and abundant pale brown dots over the wing surface; in a second specimen (♂) the wing disk is heavily marked with brown, a series of brown marks in the costal cell, a large square blotch at origin of Rs, another at tip of Sc₁ extending partly down across the cord; others at tips of R₁, R₂ and R₃; large, paler brown dots in all the cells of the wing. Venation (see fig. 2, pl. III).

Abdomen: tergites brownish; sternites dull yellow, apical third of each sclerite brown. Hypopygium (see fig. 10, pl. X): viewed

from above, 9th tergite, caudal margin almost straight with a little rounded knob or hook on either side of the median line; pleurites very short and stout, with three apical appendages, the more dorsal being the longest, slender at base, swollen subapically, the extreme tip slightly hooked and strongly chitinized, this appendage directed caudad and entad; two ventral appendages, the more dorsal being short, blunt, very strongly chitinized at its tip and with numerous, triangular denticulæ, closely and regularly set; ventral appendage slender, curved at a right angle, its tip directed cephalad. Anal tube very conspicuous, pale whitish, slightly notched at its tip. Second gonapophyses rather slender, tips expanded, the organs directed caudad. Viewed from beneath, the 9th sternite has a rectangular median protuberance.

Female.—Similar, larger; the dark apices of the abdominal sternites not well marked.

Vial No. A.—Tokyo, Japan; April 25, 1912; 1 ♀.

Vial No. 7.—Tokyo, Japan; April 25, 1912; 2 ♂, 1 ♀.

Vial No. 18.—Tokyo, Japan; June 26, 1912; 4 ♀.

Vial No. 23.—Tokyo, Japan; June 25, 1912; 3 ♂.

Vial No. 48.—Tokyo, Japan; August, 1912; 1 ♂.

Holotype.—♀. Vial 48.

Allotype.—♀. Vial A.

Paratypes.—5 ♂, 5 ♀. Vials 7, 18, 23.

Types in author's collection; paratypes in U. S. National Museum and Cornell University Collections,

This species differs from *L. varicornis* Cog. (Japan)* in its shorter antennæ; legs not all yellow, but the segments conspicuously tipped with darker; abdomen not yellow; wings with petiole of cell M_1 much longer than cell 1st M_2 , etc. *L. varicornis* also, is probably a *Pæcilostola*.

Tribe Pedicini.

Genus Tricyphona Zetterstedt.

KEY TO THE JAPANESE TRICYPHONÆ.

1. Wings hyaline or nearly so, not spotted or striped; cross-veins r-m connected with vein R_{4+5} beyond the fork of
Rs. *insulana*, sp. n.

*Proc. U.S. Nat. Mus. vol. 21, p. 304 (1893).

- Wings spotted or striped with brown or yellow; cross-vein r-m connected with the radial sector at or before its fork. . . . 2.
2. Wings with a broad, yellow subcostal streak, extending from the base of the wing to the apex; median cross-vein absent. *kuwanai*, sp. n.
- Wings with a narrow brown seam along the cord, and rounded brown spots on most of the cross-veins and at the ends of most of the longitudinal veins; median cross-vein present. *velusta*, sp. n.

Tricyphona kuwanai, sp. n.

Color yellow; mesonotum with black markings; wings with a conspicuous yellow longitudinal streak.

Female.—Length 15.8 mm.; wing 12.2 mm.; abdomen 12.4 mm.

Female.—Rostrum and palpi brown; antennæ, segment 1 brown, segments 2 to 16 light yellow, the terminal flagellar segments more brown; front and vertex brown, the hind part of the vertex, the occiput and the genæ clearer reddish brown.

Pronotum light yellow, brown medially. Mesonotal præscutum light brownish yellow, darkest medially, the sclerite with four rounded, velvety-dark brownish black spots as follows: a small rounded spot on either side of the median line, about mid-length of the sclerite; an oval spot on the sides of the sclerite, about midway between the pseudosuture and the transverse suture; a small triangular black spot on the middle of the transverse suture; scutum light yellow, with velvety-black marks as follows: a double, semilunar transverse mark on the cephalic portions of the sclerite, caudad of these marks are four small dots, the outermost larger, rounded, occupying the middle of the scutal lobes, the inner small and oval, on either side of the median line; a small elongate black mark on the suture, between the scutum and scutellum; scutellum and postnotum brown. Pleuræ light brownish yellow. Halteres light yellow. Legs: coxæ and trochanters light yellow; femora and tibiæ yellow, tip of the latter narrowly dark brown; first three tarsal segments light yellow, narrowly tipped with dark brown; segments 4 and 5 dark brown. Wings hyaline or nearly so, a broad yellow streak running from the base of the wing

around to beyond the apex, embracing the caudal portion of cell C, cell Sc, cephalic portion of cell R and 1st R₁, caudal portion of cell 2nd R₁ and outer half of cell R₂; cell C is hyaline with small, rather evenly spaced dark brown cross stripes; the margin of the wing from the end of cell C around to end of cell R₅ is light brown; the caudal margin of the longitudinal yellow streak above described is narrowly brown at the deflection of R₂, a slender brown streak runs caudad and outward along R₄₊₅, ending opposite the fork of R₁₊₂; Cu and 2nd anal margined with bright yellow. Venation (see fig. 6, plate III), R_s beyond the cross-vein r-m short, a little shorter than r-m; R₂, R₃ and R₄₊₅ all originate at a common point; R₂ at origin is perpendicular; cross-vein m lacking; basal deflection of Cu₁ at fork of M.

Abdomen: tergites light brownish yellow, with numerous slender black hairs; segment 2 with a short black sub-basal streak on the margin; segments 3 to 6 with longer marginal streaks, which cover almost the basal half of the sclerite; sternites light yellow, with black marks on the sides remote from the margin of sclerite, that on the second oblique, meeting its mate on the venter, the others longitudinal.

Vial No. 31.—Tokyo, Japan; May 7, 1912; 1 ♀.

Holotype.—♀, in Vial 31.

Type in author's collection.

Tricyphona insulana, sp. n.

Brown; wings hyaline without a stigma; no median cross-vein; legs largely yellow.

Female, length 9.6 mm.; wing 9.4 mm.

Female.—Rostrum and palpi dark brown apices of the palpal segments a little paler; antennæ, basal segments pale brown, flagellum dark brown; front, vertex and occiput dark brown, probably with a grey bloom in dry specimens.

Pronotum dark brown. Mesonotum dark brown with indications of stripes near the median line; it is probable that the thorax is covered with a grey bloom; scutum dark brown; scutellum brownish yellow; postnotum brown. Pleuræ brown. Halteres light yellow. Legs: coxæ yellow, more brown basally;

trochanters yellow; femora yellow, darkening to light brown at the tip; tibia light yellow, brown at tip; tarsi brown. Wings hyaline; veins light brown. Venation (see fig. 3, plate IV) cross-vein r-m connects R_{4+5} ; no cross-vein m.

Abdomen: tergum reddish brown, segments with a dark brown apical ring; pleural line yellow; sternites brown, ovipositor with yellow valve.

Vial No. 27.—Tokyo, Japan; April 25, 1912; 1 ♀.

Holotype, ♀, Vial No. 27.

Type in author's collection.

Related to *T. vitripennis* Doane (West. U.S.) but lacks a brown stigma, has no median cross-vein, etc. From *T. immaculata* Meigen (Europe) it differs in having cross-vein r farther removed from the tip of R_1 , cross-vein r-m far beyond the fork of R_s , not at it; the legs much more yellow, not mostly brown; ovipositor of the female yellow, not patch brown, etc.

Tricyphona vetusta, sp. n.

Wings spotted with brown; cross-vein m-cu of the wings present; cross-vein m present.

Female.—Length 16 mm.; wing 14.8 mm.; hind legs femora 8.4 mm.; tibia 10.3 mm.; tarsus 8.9 mm.

Female.—Rostrum light brownish yellow; palpi with segments dark brown, the apical ones with bases yellow; antennæ, base light brown, flagellum dark brown; front, vertex and occiput dark brown.

Pronotum dark brown. Mesonotum, præscutum, greyish with four brown stripes, the median one double, narrowed behind; scutum dark brown, the lobes paler brown; scutellum dark brown, much lighter on the sides; postnotum dark brown with a large oval spot behind on either side of the median line. Pleuræ dark brown, indistinctly variegated with darker. Halteres light yellow, the knob light brown. Legs: Coxæ, especially the fore and middle, brownish at the base, remainder light yellow; trochanters yellowish; femora yellow, darkening into brown at the tip; tibia yellowish brown, rather darker apically; tarsi dark brown. Wings, tinged with light yellow, cells C and Sc a little brighter, with

brown marks as follows: a rounded spot at Sc₂, a larger one at origin of Rs, a crossband on the cord running from the tip of Sc₁, down to fork of Cu and thence to the wing-margin along Cu₂; a round spot at cross-vein r, apical margin of the wing brown, a brown seam on cross-vein m, brown dots at ends of all the longitudinal veins; veins yellowish brown. Venation (see fig. 5, plate III); Rs in a line with R₄₊₅; R₂₊₃ short, gently arcuated; crossvein r very far distad so that R₁ beyond it is about equal to it in length; cross-vein m present, connecting M₂ with M₃; cross-vein m-cu present.

Abdomen: Tergites, segment one brown, segments two and six dull yellow, an indistinct median brown stripe becoming more plainly defined behind until on the 8th and 9th tergites it abruptly suffuses the entire sclerites; pleural stripe broad, dark brown, extending the length of the abdomen as a conspicuous lateral line; sternites light yellow, a rounded ill-defined brown mark on the 8th sternite.

Vial No. 26.—Tokyo, Japan; April 25, 1912; 1 ♀.

Holotype, ♀, in Vial 26.

Type in author's collection.

Related to *T. constans* Deone (West. U.S.) but is much smaller with a very different wing pattern. In venation, suggesting *T. vernalis* Osten-Sacken of the Eastern United States.

Tribe Cylindrotomini.

Genus Liogma Osten-Sacken.

Liogma kuwanai, sp. n.

Resembles *L. nodicornis* O. S., of the United States, but the tripartite penis-guard is very much longer and directed dorsad.

Male.—Length 15.9 mm.; wing 11.4 mm.; antennæ 3.8-3.9 mm.

Male.—Rostrum and palpi light brown, remaining segments dark brown; flagellar segments slender at base, the inner face produced into a subtriangular tooth, making the flagellum strongly serrate; front, vertex and occiput dull dark brown, very rugulose, the vertex broad.

Mesonotum dark brown, a lighter brown line extending from the median line of the scutum, branching Y-shaped and extending

to the pseudosuture, this pale line being somewhat impressed; scutum, scutellum and postnotum brown, the latter rather darker. Pleuræ, propleuræ and cephalic and dorsal portions of the mesopleuræ, up to the wing-root, yellowish; remainder of the pleuræ brownish. Halteres pale, yellow. Legs: coxæ suffused with brown; trochanters light yellow; femora yellow basally, becoming brown at the tip. Wings tinged with grey, stigma elongate-oval, brown, distinct. Venation (see fig. 4, plate IV).

Abdomen light brownish yellow, the caudal half of the 7th, 8th and 9th tergites brown. Hypopygium (see figs. 13-15, plate X): 9th tergite, viewed from above, with the lateral ears or lobes prominent, the interval between them almost straight, not deeply notched as in *nodicornis*; 9th sternite and its pleurite fused, massive, as in the genus, the apical appendate stout, directed cephalad, flattened at its apex. Viewed from the side, the penis-guard is conspicuous, tripartite as in the tribe, it is very long, arising from the ventral wall, directed caudad and thence dorsad, almost attaining the level of the dorsal edge of the 9th sternite, toward their end, directed cephalad, the tip flattened; anal tube conspicuous. Viewed from beneath, the massive sterno-pleurites meet in a straight median suture, which is membranaceous; the tripartite penis-guard is deeply concave below the forking.

Vial No. E.—Tokyo, Japan; Aug., 1912; 1 ♂.

• Holotype.—♂, Vial E.

Type in author's collection.

The difference between the American and Japanese species are shown by the following key:

1. Abdomen brown; ♂ hypopygium, 9th tergite with a deep median notch; guard of the penis short, directed caudad. (East. U. S.) *nodicornis* O. S.
- Abdomen reddish brown; ♂ hypopygium, 9th tergite without a deep median notch between the prominent lateral ears; guard of the penis elongate, conspicuous, directed caudad and dorsad, almost attaining the dorsal level of the abdomen. (Japan) *kuwanai*, sp. n.

The succeeding parts dealing the Tipulinæ will conclude the Tipulidæ.